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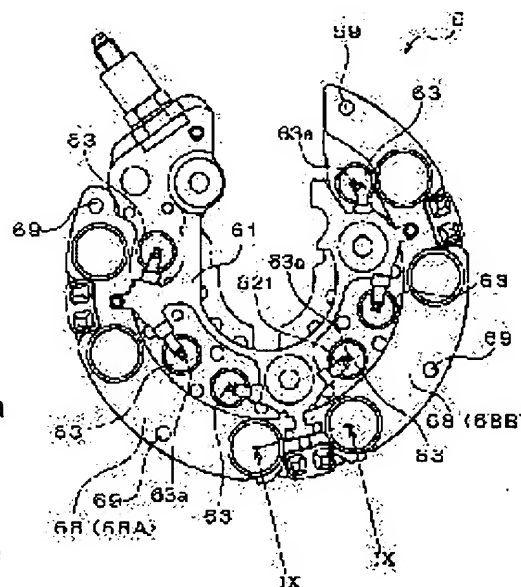
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(54) AC GENERATOR FOR VEHICLE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an AC generator for vehicle which prevents generation of a warp on a negative-pole side radiator fin.

SOLUTION: A rectifier 6 for the AC generator for vehicle has a positive-pole side radiator fin and the negative-pole side radiator fin 68 facing each other apart in the axial direction interposing a terminal board 61. The negative-pole side radiator fin 68 has an approximately arc shape having an arc-angle 180 degrees or more as a whole and consisting of two partial radiator fins 68A and 68B separated each other in the proximity of the center. Two fixing parts 69 are formed near each external shape of the partial radiator fins 68A and 68B. Assembling to the frame of the rectifier 6 is made by tightening each screw which is in a state inserted in each fixing part 69 into the frame.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the AC generator for cars carried in a passenger car, a truck, etc.

[0002]

[Description of the Prior Art] There is a type of the conventional rectifiers used for the AC generator for cars which arranges a positive-electrode side radiation fin and a negative-electrode side radiation fin in on the same flat surface as the type which carries out a laminating. For example, the rectifier of the AC generator for cars indicated by JP,2000-253625,A carries out the laminating of the negative-electrode side radiation fin with which arrangement immobilization of the positive-electrode side radiation fin with which arrangement immobilization of the positive-electrode side rectifying device is carried out, and the negative-electrode side rectifying device is carried out to shaft orientations on both sides of the terminal block under which the connecting terminal was laid, and has the structure which direct bis-fixed the negative-electrode side radiation fin to the outside end face of housing further, and was connected to the ground. Moreover, in this official report, it is indicating also about the structure of the rectifier which presses each rectifying device fit in the shaft-orientations through hole formed in each radiation fin.

[0003] Moreover, the rectifier indicated by JP,56-45062,A has the structure which separates a predetermined clearance and arranges a positive-electrode side radiation fin and a negative-electrode side radiation fin on the same flat surface. The negative-electrode side radiation fin is being directly fixed inside housing which constitutes the outer shell of the AC generator for cars.

[0004]

[Problem(s) to be Solved by the Invention] By the way, in the rectifier indicated by JP,2000-253625,A mentioned above, since it was the structure direct bis-fixed to the clamp face of the fixed part of a radii-like negative-electrode side radiation fin, when the level difference of the clamp face of the fixed part of a negative-electrode side radiation fin was large, there was a problem that there was a possibility that a negative-electrode side radiation fin may be distorted. This distortion causes a crack of jointing materials for corrugated fibreboard, such as solder for joining a negative-electrode side rectifying device to a negative-electrode side radiation fin. Moreover, in the structure which presses a negative-electrode side rectifying device fit in the shaft-orientations through hole formed in the negative-electrode side radiation fin, since this through hole deforms by distortion mentioned above, there is a possibility that sufficient placing reinforcement and electrical installation may be unestablishable. Although these problems can be coped with by processing the contact side of a negative-electrode side radiation fin and housing with a sufficient precision, and securing sufficient flatness, when they tend to lose distortion produced in a negative-electrode side radiation fin only by such processing, a processing man day will increase, and they will cause the rise of cost, and disagree with the demand of the latest cost reduction. Moreover, even if the processing approach of securing flatness sufficient by low cost exists, it will be difficult to eliminate completely distortion of the negative-electrode side radiation fin which originates

under the high temperature service of the AC generator for cars at the geometrical differential thermal expansion of housing and a negative-electrode side radiation fin.

[0005] Moreover, in the rectifier indicated by JP,56-45062,A, since a negative-electrode side radiation fin was directly fixed inside housing, it is difficult to prepare a clearance between a negative-electrode side radiation fin and housing, consequently there was a problem that the water which infiltrated into the interior of the AC generator for cars became easy to pile up. Since there is a possibility that the fault by corrosion etc. may occur when water etc. carries out long duration stagnation, structure where water etc. cannot pile up easily is desired.

[0006] This invention is created in view of such a point, and the purpose is in offering the AC generator for cars which can prevent generating of a negative-electrode side radiation fin of distortion. Moreover, other purposes of this invention are to offer the AC generator for cars with which water etc. cannot pile up easily near the negative-electrode side radiation fin.

[0007]

[Means for Solving the Problem] In order to solve the technical problem mentioned above, the AC generator for cars of this invention has the rectifier which rectifies the alternating voltage which carried out induction to the stator winding, and the frame which fixes this rectifier by rotating a rotor. Moreover, this rectifier has the terminal block under which the connecting terminal which connects the positive-electrode side radiation fin with which a positive-electrode side rectifying device is attached, the negative-electrode side radiation fin with which a negative-electrode side rectifying device is attached, and a positive-electrode side rectifying device and a negative-electrode side rectifying device was laid, and the thin-walled part formed between two or more fixed parts for fixing to a frame with a fixed means and the fixed part of these plurality is formed in the negative-electrode side radiation fin. Since the excessive stress which originates in the level difference of a frame etc. and is generated can be eased by this thin-walled part in case these fixed parts are fixed to a frame with a fixed means, since the thin-walled part is formed among two or more fixed parts of a negative-electrode side radiation fin, generating of a negative-electrode side radiation fin of distortion can be prevented.

[0008] Moreover, as for the negative-electrode side radiation fin mentioned above, it is desirable for it to be constituted by two or more partial radiation fins, and to constitute a thin-walled part by separating between the partial radiation fins of these plurality. Since it becomes possible to discharge the water which permeated near the negative-electrode side radiation fin by using the clearance part which separated between each partial radiation fin as a thin-walled part through this clearance part, the structure where water etc. cannot pile up easily is realizable. For this reason, it becomes possible to control generating of the corrosion resulting from stagnation of water etc.

[0009] Moreover, as for each of two or more partial radiation fins mentioned above, it is desirable to have the same configuration. Thereby, while being able to raise the yield of components, since [which used the same lot number] a part is manageable as elegance, reduction of cost is attained.

[0010] Moreover, as for the thin-walled part mentioned above, it is desirable to be constituted by forming a slot in the front face of a negative-electrode side radiation fin. Since it becomes possible to form a thin-walled part only by forming a slot, manufacture becomes easy. Moreover, by forming this slot in the front face of a negative-electrode side radiation fin, it becomes possible to operate a slot as gutters, such as water, and structure where water etc. cannot pile up easily can be realized.

[0011] Moreover, the negative-electrode side radiation fin mentioned above has two or more mounting holes, and it is desirable by carrying out press fit immobilization of the negative-electrode side rectifying device in a mounting hole to attach the negative-electrode side rectifying device to a negative-electrode side radiation fin. It can prevent that the fixed force of the negative-electrode side rectifying device by which press fit immobilization was carried out changes with the operating environments of the AC generator for cars with generating prevention of a negative-electrode side radiation fin of distortion, and reduction of the cost by moreover changing complicated production process management of soldering etc. into the easy junction approach is attained.

[0012] Moreover, the thing of 180 radii include angles or more which are mostly formed in the shape of radii, and met the hoop direction of a negative-electrode side radiation fin in the thin-walled part and for

which the negative-electrode side radiation fin mentioned above is mostly formed in the mid-position is desirable. Since area of each partial radiation fin can be made almost the same, it becomes possible to make almost equal cooling nature of a negative-electrode side rectifying device, and a life design and cooling design of a negative-electrode side rectifying device become easy.

[0013]

[Embodiment of the Invention] Hereafter, the AC generator for cars of 1 operation gestalt which applied this invention is explained to a detail, referring to a drawing. Drawing 1 is drawing showing the whole AC-generator configuration for cars of this operation gestalt. AC generator 1 for cars shown in drawing 1 is constituted including a stator 2, a rotator 3, a frame 4, brush equipment 5, the rectifier 6, and the rear cover 7 grade.

[0014] The stator 2 is equipped with the insulator 24 which carries out electric insulation of between a stator core 22, the stator winding 23 of a three phase circuit, and stator cores 22 and stator windings 23. The rotator 3 has cylindrical and the structure between which each put the field winding 31 concentrically coiled about from both sides through the revolving shaft 33 by the field core 32 which has six claw parts for the copper wire by which insulating processing was carried out. Moreover, the cooling fan 35 for breathing out the cooling wind absorbed from the front-side in shaft orientations and the direction of a path is attached in the end face of the field core 32 of a front-side by welding etc. Similarly, the cooling fan 36 for breathing out the cooling wind absorbed from the rear-side in the direction of a path is attached in the end face of the field core 32 of a rear-side by welding etc. Moreover, near the rear-side edge of a revolving shaft 33, the two slip rings 37 and 38 connected electrically are formed in the both ends of a field winding 31, and electric supply is performed from brush equipment 5 to a field winding 31 through these slip rings 37 and 38.

[0015] While the frame 4 has held the stator 2 and the rotator 3 and the rotator 3 is supported in the pivotable condition centering on the revolving shaft 33, the stator 2 arranged through a predetermined clearance at the periphery side of the field core 32 of a rotator 3 is being fixed. Moreover, a frame 4 has the regurgitation aperture 41 of the cooling style into the part which countered the stator winding 23 projected from the shaft-orientations end face of a stator core 22, and has the inhalation aperture 42 in the shaft-orientations end face.

[0016] Brush equipment 5 is for passing an exciting current from a rectifier 6 to the field winding 31 of a rotator 3, and has the brushes 51 and 52 pressed to each of the slip rings 37 and 38 formed in the revolving shaft 33 of a rotator 3. A rectifier 6 is for rectifying the three-phase-alternating-current electrical potential difference which is the output voltage of the stator winding 23 of a three phase, and obtaining the output power of a direct current. About the detail of a rectifier 6, it mentions later.

[0017] A rear cover 7 is for covering the electrical part of the brush equipment 5 attached in the outside of the frame 4 of a rear-side, a rectifier 6, and I.C. regulator 9 grade, and protecting these. With the metal nut 71, this rear cover 7 is being bound tight and fixed to the bolt 43 prolonged from the frame 4 of a rear-side, where a rectifier 6 is put. Moreover, the rear cover 7 mainly has two or more inhalation apertures in the opposed face of a rectifier 6, and a cooling wind is inhaled to the rear cover 7 interior through this inhalation aperture.

[0018] If the turning effort from an engine (not shown) is told to a pulley 8 through a belt etc., a rotator 3 will rotate AC generator 1 for cars which has the structure mentioned above in the predetermined direction. By impressing energizing voltage to the field winding 31 of a rotator 3 from the exterior in this condition, each claw part of a field core 32 is excited, a stator winding 23 can be made to generate a three-phase-alternating-current electrical potential difference, and a predetermined direct current is taken out from the output terminal prepared in the rectifier 6.

[0019] Next, the detail of a rectifier 6 is explained. Drawing 2 is the front view of a rectifier 6, and the condition of having seen from the rear-side is shown. Moreover, drawing 3 is the rear-face Fig. of a rectifier 6, and the condition of having seen from the frame 4 side is shown. Drawing 4 is an IX-IX line expanded sectional view shown in drawing 3.

[0020] The rectifier 6 is equipped with the positive-electrode side radiation fin 67 by which estranged to shaft orientations and opposite arrangement was carried out on both sides of the terminal block 61, and

the negative-electrode side radiation fin 68. The six positive-electrodes side rectifying device 63 turns lead 63a to a frame side, press fit immobilization is carried out at the through tube as a mounting hole, and it is joined to the connecting terminal 62 which each lead 63a projected from the terminal block 61 by TIG arc welding at the junction edge 621 by the positive-electrode side radiation fin 67. Moreover, the six negative-electrodes side rectifying device 65 turns lead 65a to a rear-side, press fit immobilization is carried out at the through tube as a mounting hole, and it is joined to the connecting terminal 62 which each lead 65a projected from the terminal block 61 by the negative-electrode side radiation fin 68 by TIG arc welding at the junction edge 622.

[0021] the negative-electrode side radiation fin 68 -- the whole -- 180 radii include angles or more -- it is almost circular and the thin-walled part by separation slot 68C is mostly formed in the mid-position. The negative-electrode side radiation fin 68 is divided into two partial radiation fins 68A and 68B by this separation slot 68C. Two fixed parts 69 are formed in each of these two partial radiation fins 68A and 68B near the appearance. this fixed part 69 is a through hole, and is shown in drawing 1 -- as -- as a fixed means -- bis--- it is in the condition which inserted 72 in this fixed part 69, and attachment by the frame 4 of a rectifier 6 is performed by [which **** and binds tight to a hole] having been formed in the frame 4.

[0022] Thus, in AC generator 1 for cars of this operation gestalt, since the excessive stress which originates in the level difference of a frame 4 etc. and is generated can be eased by this thin-walled part in case these fixed parts 69 are fixed to a frame 4 on a screw 72, since the thin-walled part by separation slot 68C is formed among two or more fixed parts 69 of the negative-electrode side radiation fin 68, generating of the negative-electrode side radiation fin 68 of distortion can be prevented. Moreover, since it becomes possible to discharge the water which permeated near the negative-electrode side radiation fin 68 by using separation slot 68C as a clearance part which separated between two partial radiation fins 68A and 68B which constitute the negative-electrode side radiation fin 68 as a thin-walled part through this separation slot 68C, the structure where water etc. cannot pile up easily is realizable. For this reason, it becomes possible to control generating of the corrosion resulting from stagnation of water etc.

[0023] Moreover, the negative-electrode side radiation fin 68 mentioned above has two or more mounting holes, and installation of the negative-electrode side rectifying device 65 to the negative-electrode side radiation fin 68 is performed by carrying out press fit immobilization of the negative-electrode side rectifying device 65 in these mounting holes. It can prevent that the fixed force of the negative-electrode side rectifying device 65 by which press fit immobilization was carried out changes with the operating environments of AC generator 1 for cars with generating prevention of the negative-electrode side radiation fin 68 of distortion, and reduction of the cost by moreover changing complicated production process management of soldering etc. into the easy junction approach is attained.

[0024] Moreover, it is mostly formed in the shape of radii, and since [to which the thin-walled part by separation slot 68C of 180 radii include angles or more met the hoop direction of the negative-electrode side radiation fin 68] it is mostly formed in the mid-position, the negative-electrode side radiation fin 68 mentioned above can make almost the same area of each partial radiation fins 68A and 68B. For this reason, it becomes possible to make almost equal cooling nature of the negative-electrode side rectifying device 65, and a life design and cooling design of the negative-electrode side rectifying device 65 become easy.

[0025] In addition, this invention is not limited to the above-mentioned operation gestalt, and various deformation implementation is possible for it within the limits of the summary of this invention. For example, although it was made to divide the negative-electrode side radiation fin 68 into two partial radiation fins 68A and 68B with the operation gestalt mentioned above by forming the thin-walled part by separation slot 68C in the negative-electrode side radiation fin 68 of a rectifier 6, a slot is formed in surface [a part of] instead of separation slot 68C, and it is good also considering this as a thin-walled part.

[0026] Drawing 5 is drawing showing the modification of a rectifier 6. Moreover, drawing 6 is the XI-XI line expanded sectional view shown in drawing 5. as shown in these drawings, the hoop direction of

the negative-electrode side radiation fin 68 was met -- it is the mid-position mostly and you may make it form slot 68D in the front face by the side of a frame 4 In this case, the part to which thickness became thin is set to thin-walled part 68E by forming slot 68D. Since it becomes possible to form thin-walled part 68E only by forming slot 68D, manufacture becomes easy. Moreover, by forming this slot 68D in the front face of the negative-electrode side radiation fin 68, it becomes possible to operate slot 68D as gutters, such as water, and structure where water etc. cannot pile up easily can be realized.

[0027] Drawing 7 is drawing showing other modifications of a rectifier 6. Moreover, drawing 8 is the XIII-XIII line expanded sectional view of drawing 7 . as shown in these drawings, the hoop direction of the negative-electrode side radiation fin 68 was met -- it is the mid-position mostly and you may make it form slot 68F in the front face by the side of the anti-frame 4 Also in this case, the part to which thickness became thin is set to thin-walled part 68G by forming slot 68F.

[0028] Moreover, since [along the hoop direction of the negative-electrode side radiation fin 68] there are four fixed parts 69, you may make it prepare a thin-walled part according to an individual with the operation gestalt mentioned above, between the fixed parts 69 which adjoined, although one thin-walled part was mostly prepared in the mid-position. Moreover, when it has wrap structure for the whole rectifier by the frame, you may make it attach a rectifier inside a frame, although the operation gestalt mentioned above explained the case where a rectifier 6 was attached in the outside of a frame 4.

[0029] Moreover, although the configuration of two partial radiation fins 68A and 68B which constitute the negative-electrode side radiation fin 68 was changed a little with the operation gestalt mentioned above, it is good even if completely the same in these configurations. In this case, while being able to raise the yield of components, since [which used the same lot number] a part is manageable as elegance, reduction of cost is attained.

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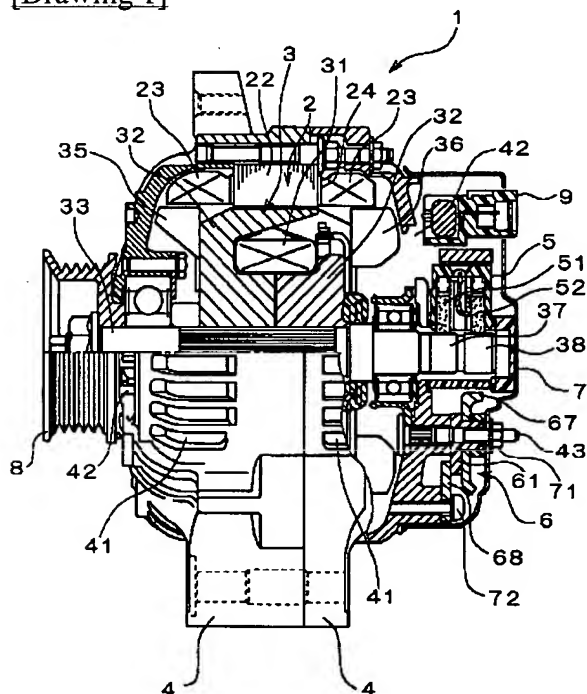
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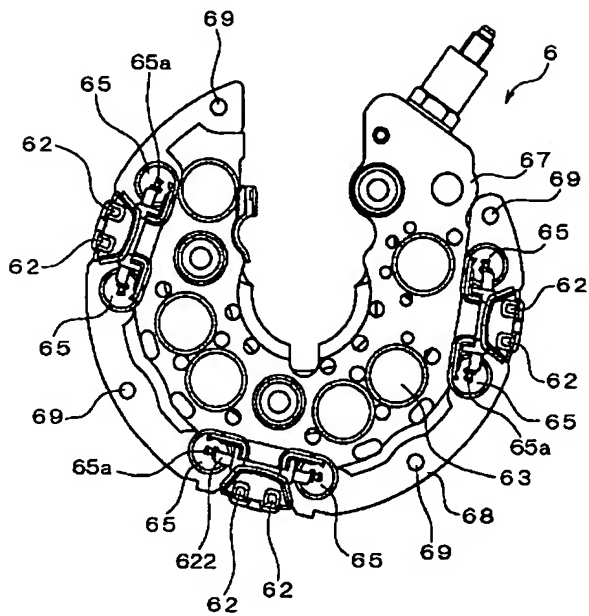
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DRAWINGS

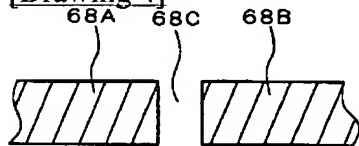
[Drawing 1]



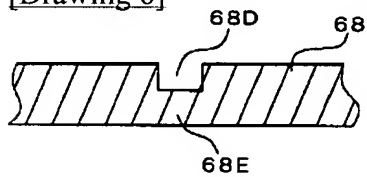
[Drawing 2]



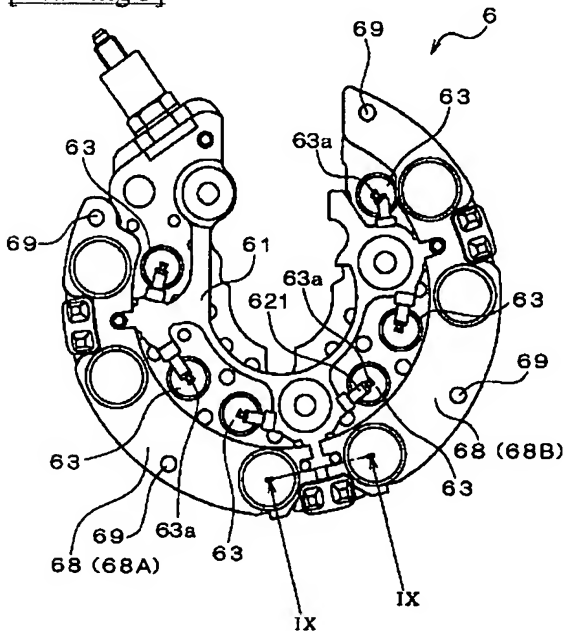
[Drawing 4]



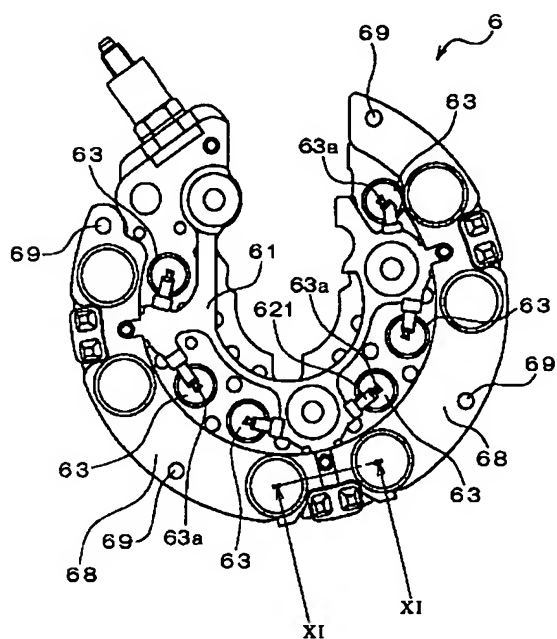
[Drawing 6]



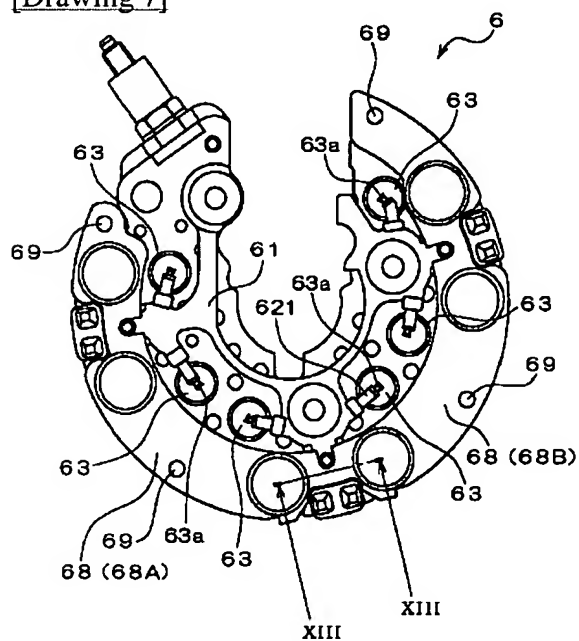
[Drawing 3]



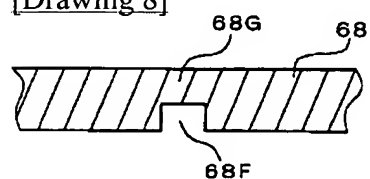
[Drawing 5]



[Drawing 7]



[Drawing 8]



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